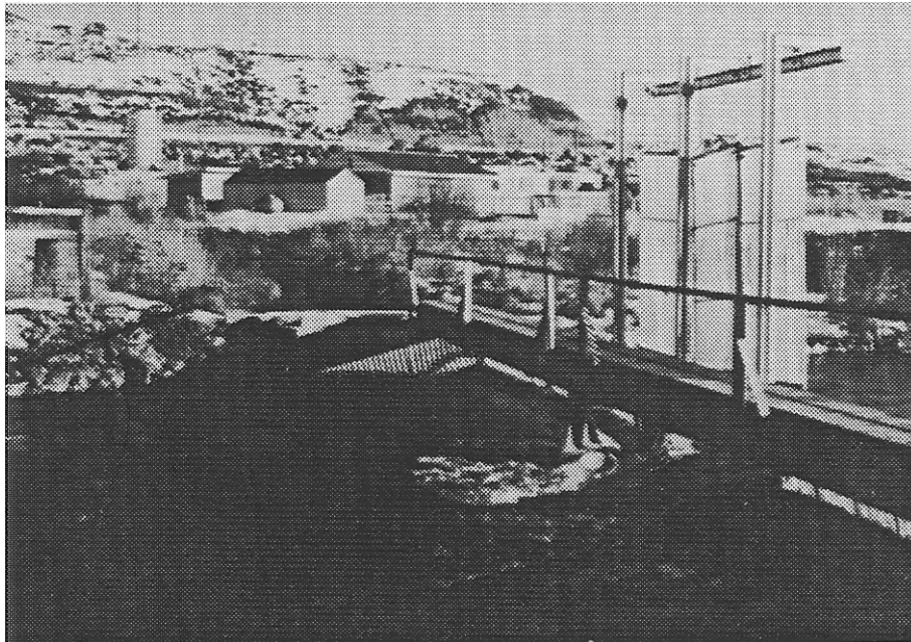




## **PAHSIMEROI FISH HATCHERY**

**1993 Summer Chinook Brood Year Report**



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## ABSTRACT

The Pahsimeroi Fish Hatchery trap was set up on June 15, and was shut down on October 12, 1993. The first summer chinook *Oncorhynchus tshawytscha* arrived on June 29, and the last fish arrived on October 5. The run consisted of 169 chinook comprised of 156 adults and 13 jacks,

The males consisted of 13 three-year olds (jacks), 12 four-year olds, and 54 five-year olds fish, for a total of 79 trapped. The females consisted of 25 four-year olds and 65 five-year olds fish, for a total of 90 trapped.

Upstream releases consisted of 61 females (17 age-4, 44 age-5), 62 males (12 age-4, 50 age-5), and 13 Jacks. There were 44 males, 61 females, and 9 jacks processed then immediately released upstream of the weir to naturally spawn. Additionally, milt was collected from 18 males and four jacks. These were also released upstream, and are reflected in the above total release numbers and age class structure.

Adults retained for Pahsimeroi Fish Hatchery production consisted of 22 males (4 age-4, 18 age-5), 4 jacks, and 29 females (8 age-4, 21 age-5). No pre-spawn mortality occurred in 1993.

A total of 29 females produced 167,200 green eggs, thus yielding on average a fecundity of 5,765 eggs. The pick-off was 8,700 for total of 158,500 viable eyed eggs, and 94.8% survival to eye-up. A total of 91,700 eyed eggs were shipped to the Sawtooth Fish Hatchery (October 1 - October 25, 1993). The resulting fry were early-reared on Sawtooth Fish Hatchery's pathogen free spring water and the 82,683 fingerling returned to the Pahsimeroi Fish Hatchery and ponded in rearing pond two on July 1, 1994 to complete their rearing cycle on Pahsimeroi Fish Hatchery river water. A total of 66,800 eyed eggs were retained at Pahsimeroi Fish Hatchery and the resulting fish reared on river water for their entire rearing cycle. These fish were early reared in raceways containing river water, and the resulting 66,110 fingerling later transferred to rearing pond one after approximately six months of raceway rearing.

Brood year 1993 smolts were released volitionally from April 11 through April 14, 1995. A 96.8% survival from eyed egg to smolt resulted in 64,648 (6,122 lbs at 10.56/lb) smolts released from Pond one, and a 90.3% survival from eyed egg to smolt resulted in 82,782 (5,913 lbs at 14/lb) smolts released from Pond two, for a total release of 147,429 smolts (12,035 lbs @ 12.25/lb).

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## **INTRODUCTION**

Pahsimeroi Fish Hatchery is owned and funded by Idaho Power Company (IPC) and is operated by the Idaho Department of Fish and Game. The chinook salmon *Oncorhynchus tshawytscha* and steelhead *Oncorhynchus mykiss* programs are mitigation for the IPC dams constructed on the Snake River in Hells Canyon. The Pahsimeroi Fish Hatchery is located near Ellis, Idaho one mile upstream on the Pahsimeroi River, with the final chinook rearing ponds located at a separate facility seven miles upstream on the Pahsimeroi River.

## **OBJECTIVES**

The objectives of the Pahsimeroi Fish Hatchery with respect to summer chinook are as follows:

1. To rear one million summer chinook smolts for release into the Pahsimeroi River,
2. To trap and spawn summer chinook adults returning to the Pahsimeroi River.

## **PAHSIMEROI FISH HATCHERY FACILITIES**

The trap facility consists of two concrete holding pens and one adult trapping pond each measuring 15 ft X 75 ft X 4.5 ft deep. Adult fish of hatchery origin are held in these pens until they are spawned. The trap has a fish ladder in the structure and a finger weir that keeps the fish from returning to the river. A 55 ft long weir crosses the Pahsimeroi River to guide the arriving fish into the trap facility.

The main Pahsimeroi Fish Hatchery site consists of two residences, two pump houses, a 10,000 gal water-storage tank, a metal storage building, a cinder block office building with attached public restroom and incubator room containing 20 double stacks of Heath incubators, and a two-bedroom dormitory and workshop. Four concrete raceways (4 ft X 100 ft) are used for early rearing of salmon from the swim-up fry to fingerling stages of development.

Two dirt-rearing ponds (40 ft X 300 ft) are located seven miles above the trap at a separate site. These are used to rear chinook from fingerling to smolt. Facilities at the upper site include a large metal storage building, a small storage building, and a feed bin for storing dry bulk feed and a walk-in freezer for storing frozen salmon feed,

## **WATER SUPPLY**

Water for the Pahsimeroi Fish Hatchery is supplied by the Pahsimeroi River and varies in temperature from 32° F during the winter to 67° F in summer (Appendix A). River water is gravity fed through an intake diversion to the fish trap and four early rearing raceways. Previously, river water was also pumped to the 10,000 gal water-storage tank and gravity fed to the incubation room for incubation of chinook eggs once they reached the eye-up stage. This practice was discontinued after brood year 1993 chinook production. The river water has a high organic load during winter, but is quite clean during the summer months.

Incubation water now consists of Specific Pathogen-free (SPF) spring water, which is pumped to the 10,000 gal water-holding tank and gravity fed to the incubators. It may also be gravity fed to two early-rearing raceways. Its temperature varies from a low of 52° F in the winter to 55° F in the summer, and has a pH of 7.8. Chinook eggs remain on the SPF water supply throughout their entire incubation period. At swim-up, the fry are placed into the raceways containing the SPF water. This water is used until the fry outgrow the space available in the SPF raceways, at which time they may be trucked to other facilities for additional rearing time on SPF water, divided among all four raceways and supplied with river water, or trucked to the earthen rearing ponds.

### **SUMMER CHINOOK TRAPPING**

Trapping for summer chinook started on June 15 and ended on October 12 (Appendix B). The first and last chinook salmon trapped arrived on June 29 and October 5, respectively. The run consisted of 156 adults and 13 jacks for a total of 169 fish. The adults consisted of 66 males and 90 females. Fork lengths were taken on all fish entering the trap (Appendices C, C-1). The age-class breakdown was done by length this year. All males 61 cm and under were classified as jacks (three-year old). Male and female fish 62 cm through 82 cm were classified as four-year olds and all fish 83 cm and over were classified as five-year olds. The male portion of the run was comprised of 13 jacks, 12 four-year olds, and 54 five-year olds. The female portion consisted of 25 four-year olds and 65 five-year olds.

### **SUMMER CHINOOK RELEASES**

Throughout the trapping season, salmon were released upstream of the weir to spawn naturally. Forty-four adult males, 61 females, and nine jacks were released above the weir for this purpose. Eight of the adult males were four-year olds and 36 were five-year olds. Seventeen of the females were four-year olds and 44 of them were five-year olds (Appendices E, E-1). Additionally, 17 adult males and five jacks were released above the weir after being used for spawning. Only a portion of milt was taken from these males prior to release.

### **HOLDING POND RECORD**

Chinook ponded for spawning consisted of 22 adult males, 4 jacks, and 29 females. Four of the adult males were four-year olds, and 18 were five-year olds. Eight of the females were four-year olds, and 21 were five-year-olds (Appendices D, D-1).

Erythromycin phosphate injections were used this year to help prevent Bacterial Kidney Disease (BKD) mortalities. Of the ponded fish, 30 were injected at 10 mg/kg, 18 were injected at the double dosage rate of 20 mg/kg, and 7 fish received no injection. Kidney samples were taken on all spawned fish, and were analyzed for BKD as part of the Investigational New Animal Drug (INAD) testing requirements. Only one female tested high positive via Enzyme-Linked Immunosorbent Assay (ELISA) and her progeny were early-reared separately from the other lots.

Additionally, the females were treated three times a week, for one hour with 166.7 ppm formalin. Males were not treated with formalin.

A black plastic shade was used to cover the water surface of the female holding pen to reduce the stress from the public. The yard lights were turned off during the summer to induce the fish to ripen earlier. The fish were left undisturbed until late August, when sorting for ripe fish began. This was the first year that there was no pre-spawn mortality.

### **SUMMER CHINOOK SPAWNING INFORMATION**

Summer chinook spawning began on August 23 and concluded on October 6. A total of 29 females were spawned for 167,200 green eggs. Fecundity averaged 5,763 eggs per female. The pick-off was 8,700 yielding 158,500 eyed eggs (Appendix G). The eye-up percentage was 94.8%. At eye-up, 91,710 eggs were transferred to the Sawtooth Fish Hatchery to be hatched and the fry early-reared on Sawtooth Fish Hatchery pathogen free spring water, later to be returned to the Pahsimeroi Fish Hatchery. This was done to compare whirling disease infection rates and return rates with fish reared on river water for their entire production cycle.

### **SPAWNING TECHNIQUE**

Females were sorted twice a week for ripeness. Ripe fish were killed by a blow to the head, and bled by severing the caudal artery. Females were then suspended from a hook, and dry-spawned by incision. The eggs were collected in a colander to drain the ovarian fluid. A sample of ovarian fluid was retained for virology tests. The eggs were then placed into a spawning bucket and the sperm from one male added. The eggs were then hand stirred. Spring water was added to activate the sperm and the eggs stirred again, and allowed to set for five minutes. Fish were spawned at a ratio of 1:1 male:female.

The eggs were then loaded into the incubator trays at the rate of one female per tray. Each of these trays, containing a 200 ppm iodine solution (Argentyne), was then allowed to set for 60 min before being put back into the water flow of the incubator stack.

After 48 hrs, daily treatments of 1,667 ppm formalin were used to reduce fungus growth before eye-up. The first lot of eggs eyed up September 13 and the final lot on October 27. After shocking, the eggs were handpicked, measured, and enumerated by electronic egg-counter. The eggs were loaded back into the incubators at a density of 1,000 ml. per tray for hatching. The dead egg numbers were subtracted from the eyed egg numbers to get the eye-up percentage.

## **ADULT SPAWNER DISEASE SAMPLING**

Ovarian and kidney samples were collected from all the females spawned. These samples were used to test for virus and BKD, respectively. Eggs from each female were put into separate trays. None of the females tested low positive or intermediate positive via ELISA. One female showed high positive results for BKD via ELISA, however, and her progeny were reared separately during early rearing. All females tested negative for virus.

Twenty head wedges were collected from both males and females used for spawning throughout the run, to test for the causative agent of whirling disease, *Myxobolus cerebralis*. None of the head wedges tested positive.

## **CARCASS DISPOSITION**

Of the 55 fish ponded, 48 were injected with erythromycin and all fish were treated externally with formalin. Since the fish were treated, the carcasses had to be hauled to the landfill to be buried,

## **FISH PRODUCTION**

Transfer of salmon fry into the raceways began during mid-December and continued through March. Initially, these fish were fed BioDiet starter and grower at a rate of 3% of body weight. This was increased gradually until a peak of 4.5% body weight was reached, then the percentage of body weight to feed was decreased with increasing fish size. During May 1994, the fry were fed a 4.5% Aquamycin 100 feed mixture as a prophylactic treatment for Kidney disease. The treatment rate was 10 mg/kg fish daily for a 21 day period.

The fish were ponded during late June and early July after being marked. Pond one received 60,119 fish at 75 per pound. Raceway one retained 5,757 fish. These were the progeny of a high BKD female, so they remained in raceway one until construction necessitated their transfer to pond one. None of these fish exhibited symptoms indicative of BKD. They were transferred to pond one in September 1994 at a size of 25 per pound.

During early July, 82,917 fry at 151 per pound were transferred from the Sawtooth Fish Hatchery to the Pahsimeroi Fish Hatchery and ponded in pond two. These fish originated from Pahsimeroi Fish Hatchery egg-takes and were early-reared in Sawtooth's pathogen-free well water.

All fish were fed Bio Products BioMoist feed pellets after ponding, with another 21-day Aquamycin treatment at the dosage rate of 10 mg/kg fish weight starting in late September.

Pond one fish were fed a total of 8,216 lbs of feed during their production cycle, for a total weight gain of 5,984 lbs, yielding a conversion of 1.37. Pond two fish were fed a total of 7,731 lbs of feed and gained a total of 5,751 lbs for a conversion of 1.34. Total feed fed was 15,947 for a total conversion of 1.36. Production costs are summarized in Appendix H. Losses and survival percentages by life stage are summarized in Appendix I.



## **FISH RELEASES**

A total of 147,429 summer chinook smolts were released volitionally from the rearing ponds from April 11 through April 14, 1995 (Appendix I). Pond one totaled 64,642 smolts (6,122 lbs at 10.56/lbs). Pond two totaled 82,787 smolts (5,913 lbs at 14/lbs).

The screens and one set of boards were pulled daily until the ponds were emptied. Due to the relatively late release date this year, no fish had to be forced out of the ponds.

## **FISH HEALTH**

### **Diseases Encountered and Treatment**

Pahsimeroi Fish Hatchery has been positive for whirling disease for almost a decade. This year was no different. Half of the fish were early-reared at Sawtooth Fish Hatchery to avoid early challenges of the parasite *Myxobolus cerebralis*, the causative agent of whirling disease. Once the fish reached a minimum of seven cm, the fish were ponded at the upper facility at Pahsimeroi Fish Hatchery.

Prophylactic treatments of erythromycin medicated feed were administered twice in accordance with Pahsimeroi Fish Hatchery's INAD protocols. *Renibacterium* was not found via Florescent Antibody Test (FAT) methods. Pooled samples examined via ELISA methods were 4/4+ via ELISA low and 0/20 + via FAT techniques.

Early rearing, at the lower facility's raceways, has chronic problems with Environmental Gill Disease. As soon as these fish are ponded at the upper facility, the loss to gill disease disappears,

### **Acute Losses**

Acute losses were not experienced at Pahsimeroi Fish Hatchery. Chronic losses were present due to Environmental Gill Disease, but have been reduced significantly by the addition of baffles to the early rearing raceways.

### **Other Assessments**

Pahsimeroi Fish Hatchery needs to improve the water source for the lower and upper facility. The rearing programs should utilize Specific Pathogen-free (SPF) water to avoid *Myxobolus cerebralis* the causative agent of whirling disease. To completely avoid the parasite, the dirt ponds at the upper facility would have to be replaced to concrete raceways. Avoidance of this parasite would also help in reducing *Renibacterium* in Pahsimeroi Fish Hatchery stock.

In the future, Pahsimeroi Fish Hatchery will have the opportunity to rear summer chinook. It is critical that the Pahsimeroi Fish Hatchery is renovated and these impediments to culture are corrected.

## **FISH MARKING**

All the 1993 brood year fish received a right ventral (RV) clip. This was done during the first week of May 1994. The fish retained at the Pahsimeroi Fish Hatchery were clipped in the early-rearing raceways prior to transfer to the rearing pond one. Fish early-reared at Sawtooth were clipped indoors in vats and later transferred from Sawtooth Fish Hatchery directly to rearing pond two.

A total of 65,876 RV clipped fish (early-reared at Pahsimeroi Fish Hatchery) were placed into pond one to complete their rearing cycle. Pond two received 82,917 RV clipped fish (early-reared at Sawtooth Fish Hatchery).

Additionally, 500 fish from each pond were Passive Integrated Transponder (PIT) tagged in February 1995. Rearing pond numbers and early-rearing arrangement (river water or SPF) were noted in the PIT tag file. The 1993 brood year chinook did not receive coded-wire tags.

Also, 571 brood year 1993 smolts with RV clips were captured via screw trap during their out migration and PIT tagged. Brood year and RV clips were noted in the tagging files.

## **PAHSIMEROI FISH HATCHERY IMPROVEMENTS**

Idaho Power personnel constructed new adult holding pen structures adjacent to the spawn shed. These units feature moveable floors so that Pahsimeroi Fish Hatchery personnel are simply netting ripe fish into the spawn shed without entering the ponds.

A new residence was completed at the lower facility and the old residence was removed from the rearing pond facility. A new metal storage building was also completed at the rearing ponds.

Electric drum screens were installed at both the lower facility and rearing pond intake diversions. A bypass pipe was installed just upstream of these drums so that any juvenile steelhead or chinook entering these intakes can be shunted back to the river. Weir panels were replaced with new units as needed and all fencing around the rearing ponds was repaired or replaced.

## **STAFFING**

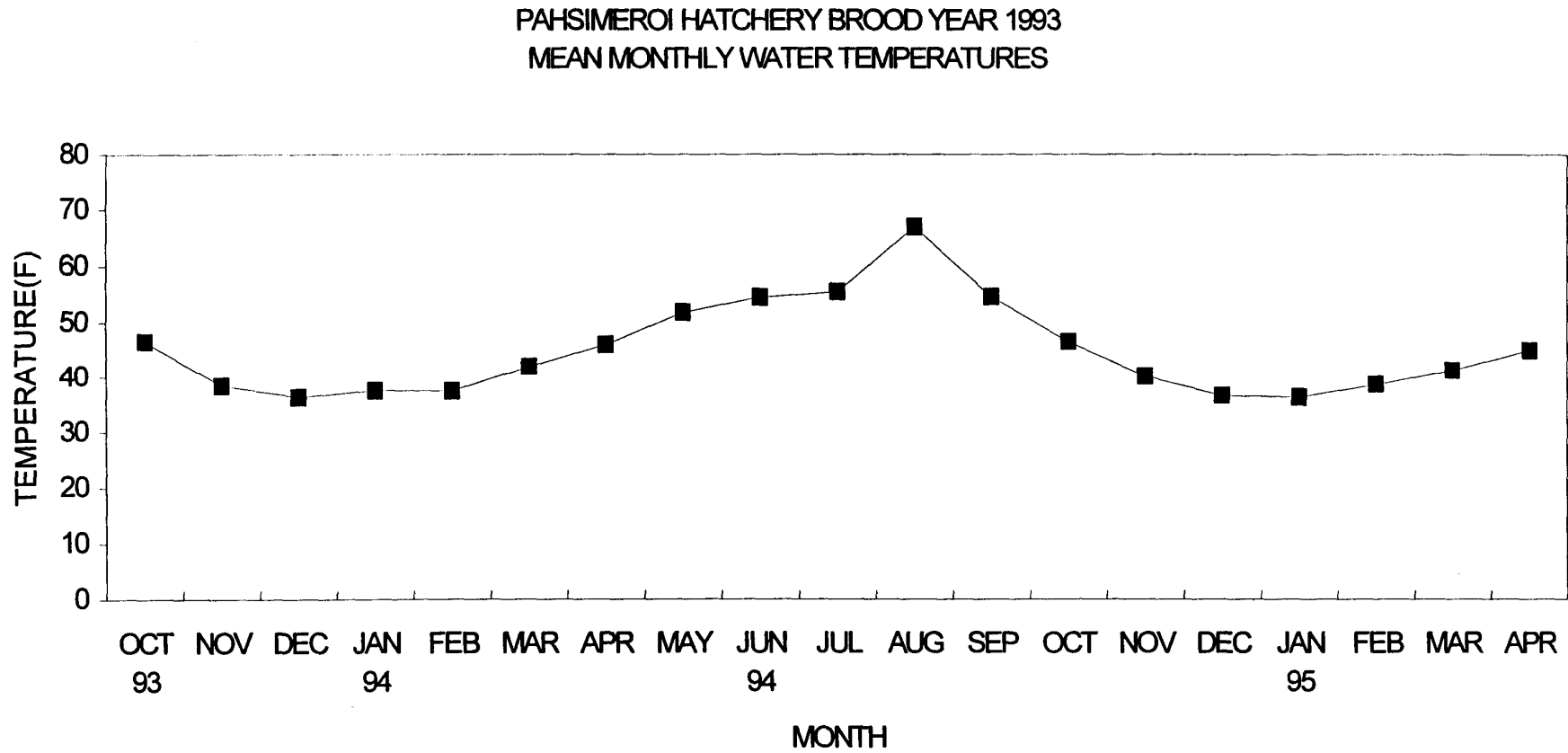
The Pahsimeroi Fish Hatchery is staffed with two permanent employees; a Hatchery Manager I, and a Hatchery Assistant Manager. Several temporaries are employed at various times of the year to help with the spawning of steelhead and salmon.

## **ACKNOWLEDGMENTS**

The crew at Pahsimeroi Fish Hatchery would like to express their appreciation to all those who helped with the spawning, and transporting of steelhead and salmon. We would also like to thank Paul Abbott and the staff of Idaho Power Company for their continued help and support.

## APPENDICES

Appendix A. Brood Year 1993 Rearing Water Temperatures.



Appendix B. Brood Year 1993 Chinook Salmon Run Timing at Pahsimeroi Fish Hatchery.

DATE	Total	Jacks	Males	Females
JUN 29	2		1	1
30	0			
JULY 1	0			
2	0			
3	0			
4	0			
5	1			1
6	0			
7	0			
8	0			
9	3		1	2
10	3		1	2
11	1			1
12	2			2
13	2		1	1
14	1			1
15	3		1	2
16	1			1
17	1		1	
18	2		2	
19	1		1	
20	0			
21	5	1	1	3
22	3		2	1
23	1		1	
24	2		1	1
25	2		1	1
26	5	1	1	3
27	7	1	2	4
28	2		2	
29	2			2
30	2		1	1
31	10		4	6
AUG 1	1			1
2	2			2
3	5	1	1	3
4	4		3	1
5	4	1	3	
6	3	1	1	1
7	1			1
8	1			1
9	2	1		1
10	0			
11	4	2		2
12	1		1	
13	1		1	
14	0			
15	0			
16	0			
17	3		1	2
18	2		1	1

Appendix B. Brood Year 1993 Chinook Salmon Run Timing at Pahsimeroi Fish Hatchery  
(Continued).

DATE	Total	Jacks	Males	Females
19	3	1	1	1
20	3	1	1	1
21	1		1	
22	2		2	
23	0			
24	0			
25	0			
26	1	1		
27	0			
28	1		1	
29	0			
30	3		1	2
31	1		1	
SEP 1	1			1
2	4		4	
3	2		2	
4	2		1	1
5	2			2
6	1			1
7	1			1
8	2			2
9	2		1	1
10	2		2	
11	4		1	3
12	3		1	2
13	4		3	1
14	0			
15	1			1
16	2			2
17	2	1		1
18	1			1
19	1			1
20	1			1
21	2			2
22	1		1	
23	1			1
24	2		1	1
25	2		2	
26	1			1
27	1		1	
28	2		1	1
29	2			2
30	2			2
OCT 1	0			
2	0			
3	0			
4	0			
5	2			2
6	0			
7	0			
TOTAL	169	13	66	90

Appendix C. Length Frequency of Chinook Trapped by Sex at Pahsimeroi Fish Hatchery.

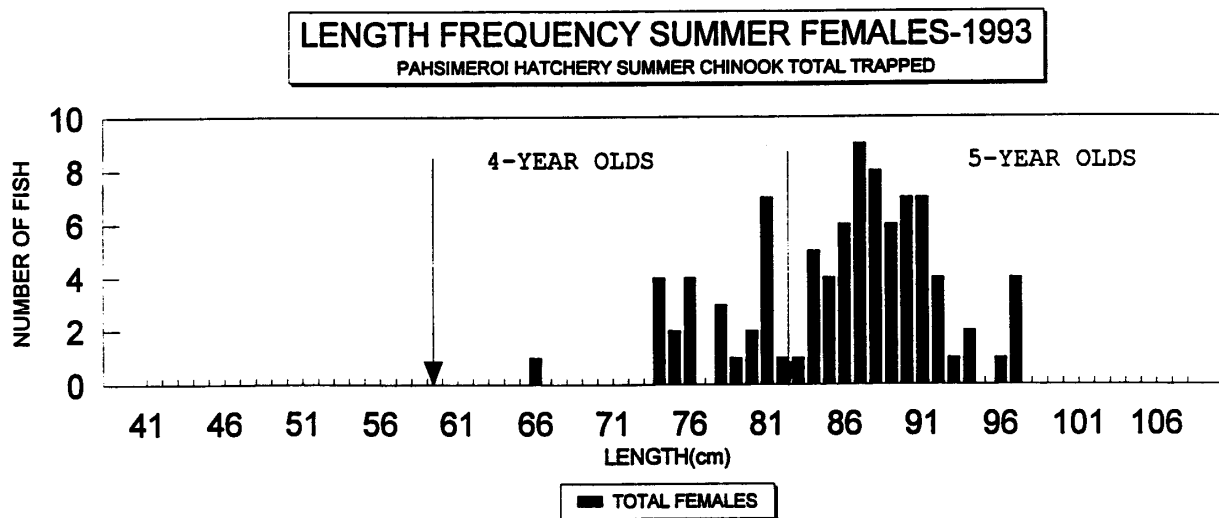
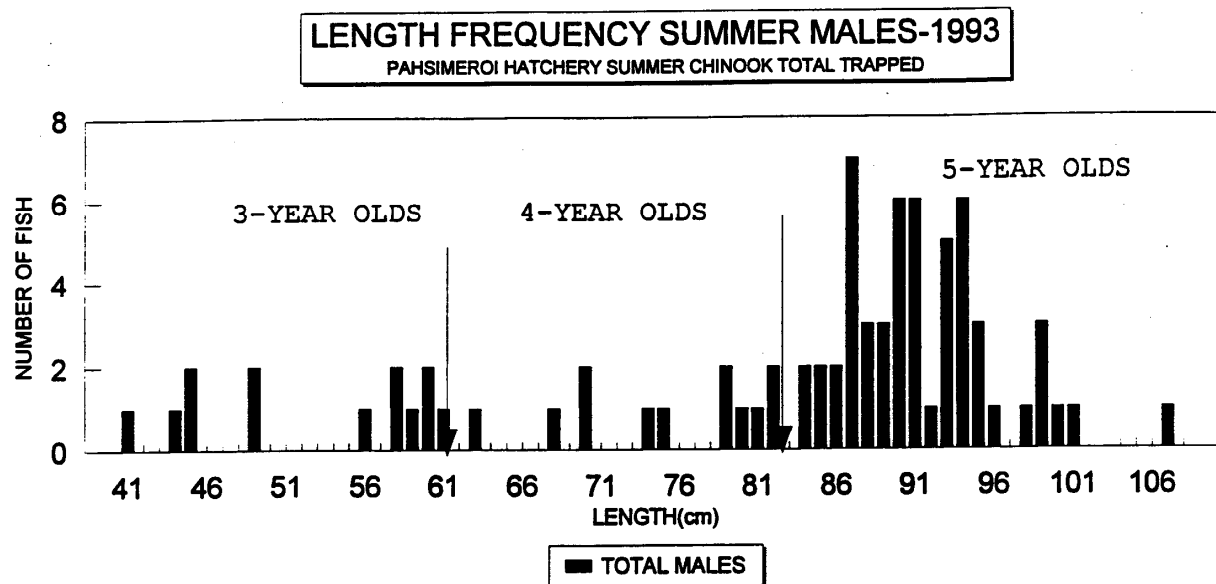
	Length (cm)	Total Trapped	Males	Females	Length (in)
	41	1	1		16.1
	42	0			16.5
	43	0			16.9
	44	1	1		17.3
	45	2	2		17.7
	46	0			18.1
	47	0			18.5
	48	0			18.9
	49	2	2		19.3
	50	0			19.7
	51	0			20.1
	52	0			20.5
	53	0			20.9
	54	0			21.3
	55	0			21.7
	56	1	1		22.0
	57	0			22.4
	58	2	2		22.8
	59	1	1		23.2
	60	2	2		23.6
End 3-yr-olds	61	1	1		24.0
4-yr-olds	62	0			24.4
	63	1	1		24.8
	64	0			25.2
	65	0			25.6
	66	1		1	26.0
	67	0			26.4
	68	1	1		26.8
	69	0			27.2
	70	2	2		27.6
	71	0			28.0
	72	0			28.3
	73	0			28.7
	74	5	1	4	29.1
	75	3	1	2	29.5
	76	4		4	29.9
	77	0			30.3
	78	3		3	30.7
	79	3	2	1	31.1
	80	3	1	2	31.5
	81	8	1	7	31.9



Appendix C. Length Frequency of Chinook Trapped by Sex at Pahsimeroi Fish Hatchery  
(Continued).

	<b>Length (cm)</b>	<b>Total Trapped</b>	<b>Males</b>	<b>Females</b>	<b>Length (in)</b>
End 4-yr-olds	82	3	2	1	32.3
5-yr-olds	83	1		1	32.7
	84	7	2	5	33.1
	85	6	2	4	33.5
	86	8	2	6	33.9
	87	16	7	9	34.3
	88	11	3	8	34.6
	89	9	3	6	35.0
	90	13	6	7	35.4
	91	13	6	7	35.8
	92	5	1	4	36.2
	93	6	5	1	36.6
	94	8	6	2	37.0
	95	3	3		37.4
	96	2	1	1	37.8
	97	4		4	38.2
	98	1	1		38.6
	99	3	3		39.0
	100	1	1		39.4
	101	1	1		39.8
	102	0			40.2
	103	0			40.6
	104	0			40.9
	105	0			41.3
	106	0			41.7
	107	1	1		42.1
	108	0			42.5
<b>Totals:</b>		<b>169</b>	<b>79</b>	<b>90</b>	

Appendix C-1. Length Frequency Graphic of Total Chinook Trapped by Sex.



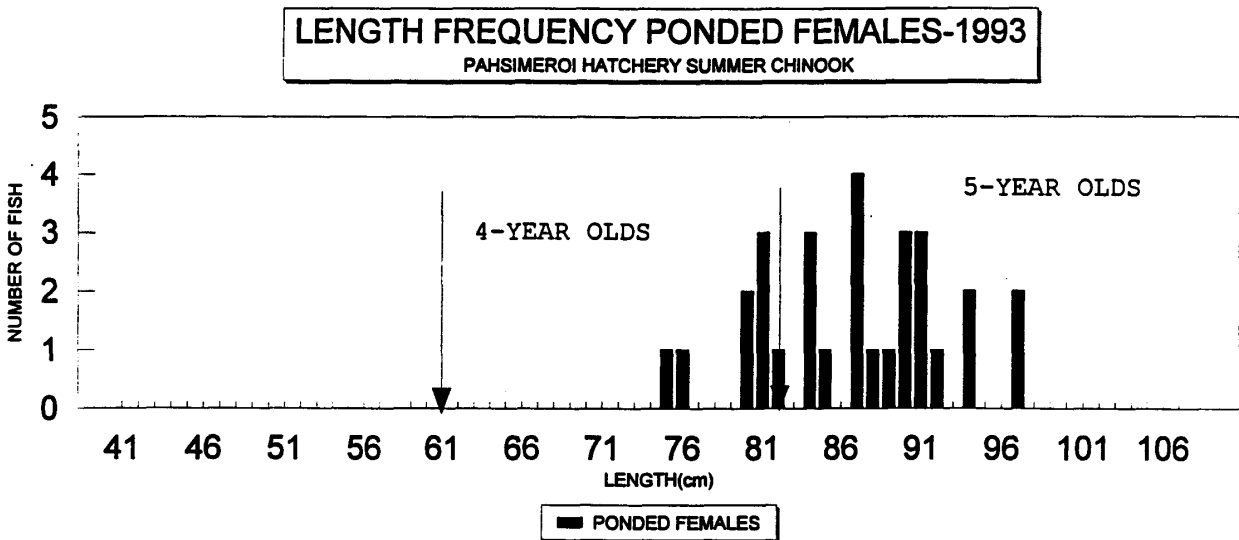
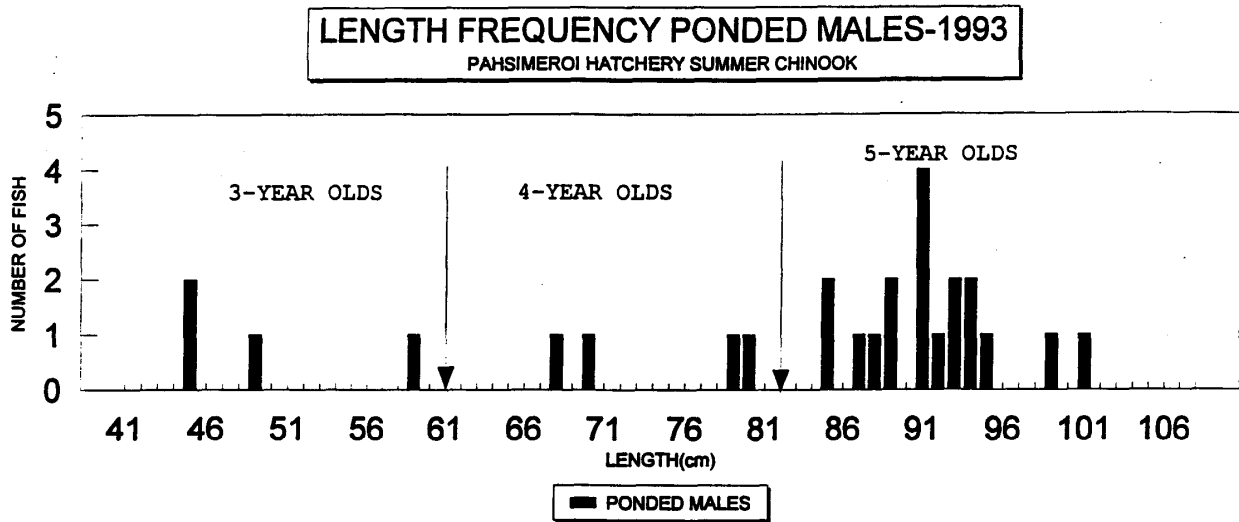
Appendix D. Length Frequency of Ponded Summer Chinook at Pahsimeroi Fish Hatchery.

	Length (cm)	Total Spawned	Males	Females	Length (in)
	41	0			16.1
	42	0			16.5
	43	0			16.9
	44	0			17.3
	45	2	2		17.7
	46	0			18.1
	47	0			18.5
	48	0			18.9
	49	1	1		19.3
	50	0			19.7
	51	0			20.1
	52	0			20.5
	53	0			20.9
	54	0			21.3
	55	0			21.7
	56	0			22.0
	57	0			22.4
	58	0			22.8
	59	1	1		23.2
End 3-yr-	60	0			23.6
4-yr-olds	61	0			24.0
	62	0			24.4
	63	0			24.8
	64	0			25.2
	65	0			25.6
	66	0			26.0
	67	0			26.4
	68	1	1		26.8
	69	0			27.2
	70	1	1		27.6
	71	0			28.0
	72	0			28.3
	73	0			28.7
	74	0			29.1
	75	1		1	29.5
	76	1		1	29.9
	77	0			30.3
	78	0			30.7
	79	1	1		31.1
	80	3	1	2	31.5
	81	3		3	31.9
End 4-yr-	82	1		1	32.3
5-yr-olds	83	0			32.7

Appendix D. Appendix D. Length Frequency of Poned Summer Chinook at Pahsimeroi Fish Hatchery (Continued).

<b>Length (cm)</b>	<b>Total Spawned</b>	<b>Males</b>	<b>Females</b>	<b>Length (in)</b>
84	3		3	33.1
85	3	2	1	33.5
86	0			33.9
87	5	1	4	34.3
88	2	1	1	34.6
89	3	2	1	35.0
90	3		3	35.4
91	7	4	3	35.8
92	2	1	1	36.2
93	2	2		36.6
94	4	2	2	37.0
95	1	1		37.4
96	0			37.8
97	2		2	38.2
98	0			38.6
99	1	1		39.0
100	0			39.4
101	1	1		39.8
102	0			40.2
103	0			40.6
104	0			40.9
105	0			41.3
106	0			41.7
107	0			42.1
108	0			42.5
<b>Totals:</b>	<b>55</b>	<b>26</b>	<b>29</b>	

Appendix D-1. Length Frequency Graphic of Poned Summer Chinook



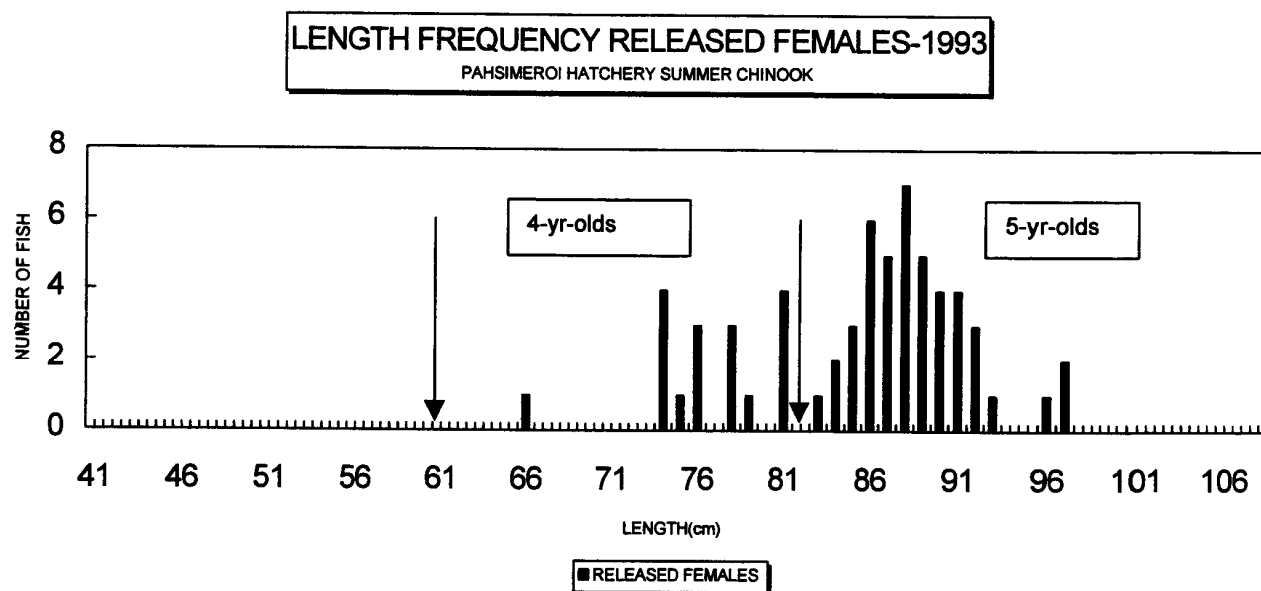
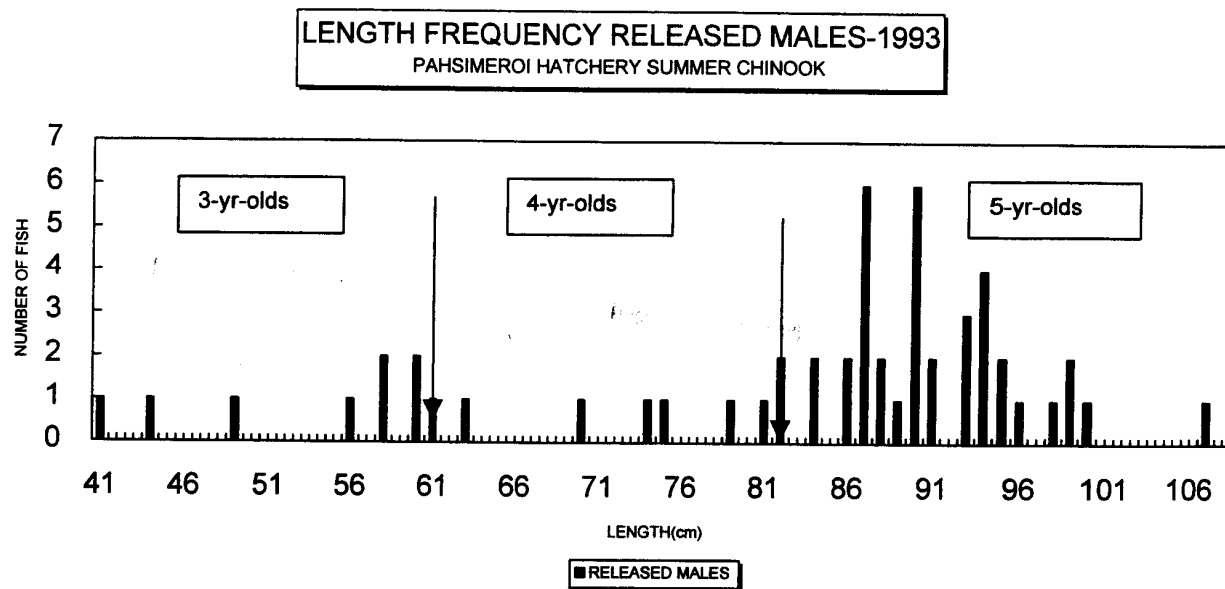
Appendix E. Length Frequency Of Released Summer Chinook BY93 at Pahsimeroi Fish Hatchery

	<b>Length (cm)</b>	<b>Total Released</b>	<b>Males</b>	<b>Females</b>	<b>Length (in)</b>
	41	1	1		16.1
	42	0			16.5
	43	0			16.9
	44	1	1		17.3
	45	0			17.7
	46	0			18.1
	47	0			18.5
	48	0			18.9
	49	1	1		19.3
	50	0			19.7
	51	0			20.1
	52	0			20.5
	53	0			20.9
	54	0			21.3
	55	0			21.7
	56	1	1		22.0
	57	0			22.4
	58	2	2		22.8
	59	0			23.2
	60	2	2		23.6
End 3-yr-olds	61	1	1		24.0
4-yr-olds	62	0			24.4
	63	1	1		24.8
	64	0			25.2
	65	0			25.6
	66	1		1	26.0
	67	0			26.4
	68	0			26.8
	69	0			27.2
	70	1	1		27.6
	71	0			28.0
	72	0			28.3
	73	0			28.7
	74	5	1	4	29.1
	75	2	1	1	29.5
	76	3		3	29.9
	77	0			30.3
	78	3		3	30.7
	79	2	1	1	31.1

Appendix E. Length Frequency Of Released Summer Chinook BY93 at Pahsimeroi Fish Hatchery (Continued).

	<b>Length (cm)</b>	<b>Total Released</b>	<b>Males</b>	<b>Females</b>	<b>Length (in)</b>
	80	0			31.5
	81	5	1	4	31.9
	82	2	2		32.3
5-yr-olds	83	1		1	32.7
	84	4	2	2	33.1
	85	3		3	33.5
	86	8	2	6	33.9
	87	11	6	5	34.3
	88	9	2	7	34.6
	89	6	1	5	35.0
	90	10	6	4	35.4
	91	6	2	4	35.8
	92	3		3	36.2
	93	4	3	1	36.6
	94	4	4		37.0
	95	2	2		37.4
	96	2	1	1	37.8
	97	2		2	38.2
	98	1	1		38.6
	99	2	2		39.0
	100	1	1		39.4
	101	0			39.8
	102	0			40.2
	103	0			40.6
	104	0			40.9
	105	0			41.3
	106	0			41.7
	107	1	1		42.1
	108	0			42.5
	<b>Totals:</b>	<b>114</b>	<b>53</b>	<b>61</b>	

Appendix E-1. Length Frequency Graphic of Released Summer Chinook.





Appendix F. Pathology Summer Chinook Health Report, Pahsimeroi Fish Hatchery BY93.

SUMMARY OF FISH AUTOPSY			
ACCESSION NO:	95-123	LOCATION:	Pahsimeroi
SPECIES:	Chinook Spring	AUTOPSY DATE:	03/23/95
STRAIN:	Pah	AGE:	juv
UNIT:	Pond 1	SAMPLE SIZE:	20
REASON FOR AUTOPSY:	prelib		
INVESTIGATOR(S):	Munson		
REMARKS:	Reared Entirely at Pahsimeroi		

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	38.40	2.36	0.06
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.41	0.89	0.14

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

VALUES AS PERCENTS OF TOTAL SAMPLE																			
EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	20	1	0
B2	0	C	0	L	0	2	0	2	1	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	4	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	5	E	0	Mean=0.0		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			0	0			Mean=3.40								OT	0		
MI	0																		
OT	0																		

SUMMARY OF NORMALS									
20	20	20	20	20	20	20	20	20	0
SEX	M: 0		F: 0		U: 0				

GENERAL REMARKS:	
FINS:	GONADS:
SKIN:	OTHER:

Appendix F. Pathology Summer Chinook Health Report, Pahsimeroi Fish Hatchery  
BY93 (Continued).

**SUMMARY OF FISH AUTOPSY**

ACCESSION NO:	95-124	LOCATION:	Pahsimeroi
SPECIES:	Chinook Spring	AUTOPSY DATE:	03/23/95
STRAIN:	Pahsimeroi	AGE:	juv
UNIT:	Pond 2	SAMPLE SIZE:	20
REASON FOR AUTOPSY:	prelib		
INVESTIGATOR(S):	Munson		
REMARKS:	Fish early reared at Sawtooth Fish Hatchery		

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	56:40	3.83	0.07
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	9.49	0.77	0.08

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

**VALUES AS PERCENTS OF TOTAL SAMPLE**

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	20	1	0
B2	0	C	0	L	0	2	0	2	1	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	4	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	5	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			0	0			Mean=3.60								OT	0		
MI	0																		
OT	0																		

**SUMMARY OF NORMALS**

20	20	20	20	20	20	20	20	20	20	0
SEX	M: 0		F: 0		U: 0					

**GENERAL REMARKS:**

FINS:	GONADS:
SKIN:	OTHER:

Appendix G. Brood Year 1993 Egg Incubation Record at Pahsimeroi Fish Hatchery.

Lot No.	Tray No.	Spawn Date	Eyed No.	Pickoff	Green No.	% Eye-Up
LOT 1	1	8/23	4805	83	4888	98.30
LOT 2	1	8/30	4538	250	4788	94.78
LOT 3	1	9/7	2705	2850	5555	48.69
	2	9/7	4994	57	5051	98.87
	3	9/7	4472	76	4548	98.33
LOT 4	1	X9/10	5122	132	5254	97.49
	2	X9/10	4764	41	4805	99.15
	3	X9/10	5570	51	5621	99.09
	4	X9/10	3149	68	3217	97.89
LOT 5	1	KD9/13	6243	146	6389	97.71
	2	X9/13	5152	338	5490	93.84
LOT 6	1	X9/16	5441	42	5483	99.23
	2	X9/16	4898	48	4946	99.03
	3	X9/16	7019	80	7099	98.87
	4	X9/16	6537	198	6735	97.06
LOT 7	1	X9/20	6355	573	6928	91.73
	2	9/20	7014	88	7102	98.76
	3	X9/20	5519	85	5604	98.48
	4	X9/20	5792	31	5823	99.47
	5	9/20	5262	1100	6362	82.71
LOT 8	1	X 9/23	6303	55	6358	99.13
	2	9/23	5600	170	5770	97.05
	3	X 9/23	6246	58	6304	99.08
LOT 9	1	X 9/27	7853	74	7927	99.07
	2	9/27	5706	850	6556	87.03
LOT 10	1	X 9/30	5990	432	6422	93.27
	2	9/30	5565	480	6045	92.06
LOT 11	1	10/4	3356	105	3461	96.97
LOT 12	1	10/6	6512	110	6622	98.34
Totals	29		158500	8700	167200	94.80

TOTALS ROUNDED TO NEAREST  
HUNDRED KD=CONFIRMED POSITIVE KD  
29 FEMALES SPAWNED @ 5,763 AVG. PER  
FEMALE ONE FEMALE SPAWNED PER TRAY  
SHIPPED TO SAWTOOTH:91,710  
RETAINED AT PAHSIMEROI: 66,772

X=SHIPPED TO SAWTOOTH HATCHERY

Appendix H. Brood Year 1993 Production Costs at Pahsimeroi Fish Hatchery.

<b>Number Of Fish</b>	<b>Pounds Of Feed Fed</b>	<b>Cost Of Feed</b>	<b>Pound Of Fish</b>	<b>Conversion</b>	<b>Total Budget*</b>	<b>Cost Per Thousand Fish</b>	<b>Cost Per Pound Of Fish</b>
147,429	15,947	\$8,824.68	11,735	1.36	\$196,319.68	\$1,331.62	\$16.70

\* Does not include capital outlay

Appendix I. Brood Year 1993 Egg to Smolt Survival at Pahsimeroi Fish Hatchery.

<b>Life Stage</b>	<b>Numbers</b>	<b>Survival Percentages</b>
Green Eggs	167200	
Egg Pickoff	8700	
Eyed Eggs	158500	94.8
Alevin Pickoff	6549	
Fry Ponded	151951	90.9
Fry Mortality	3158	
Fingerling Ponded	148793	90
Fingerling Mortality	1364	
Smolts Released	147429	88.1

Appendix J. Pahsimeroi Fish Hatchery Release and Return History.

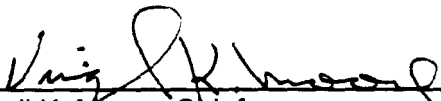
DATE RELEASED	NUMBER	3-YRS	4-YRS	5-YRS	TOTAL	YEAR OF RETURN	% RETURN
MAY 1970	300000	89	N/A	101	N/A	71,72,73	N/A
MAY 1971	250000	40	425	14	479	72,73,74	0.192
MAY 1972	250000	20	138	76	234	73,74,75	0.094
MAY 1973	347000	1	5	32	38	74,75,76	0.011
MAY 1974	330000	8	189	436	633	75,76,77	0.192
MAY 1975	114000	53	115	X	X	76,77,78	X
MAY 1976	121000	7	X	32	X	77,78,79	X
MAY 1977	235000	X	0	4	X	78,79,80	X
MAY 1978	218000	1	29	13	43	79,80,81	0.020
MAR 1983	13690	11	72	30	113	84,85,86	0.825
APR 1984	55800	27	278	52	357	85,86,87	0.640
APR 1985	209155	37	408	716	1161	86,87,88	0.555
MAR 1986	12095	13	47	31	91	87,88,89	0.752
MAR 1987	258600	75	180	42	297	88,89,90	0.115
MAR 1988	598500	135	389	79	603	89,90,91	0.101
MAR 1989	1016300	39	139	27	205	90,91,92	0.020
MAR 1990	1058000	20	98	119	237	91,92,93	0.022
MAR 1991	227500	6	37	1	44	92,93,94	
MAR 1992	605900	13	26	0	39	93,94,95	
APR 1993	375000	7	73		80	94,95,96	
APR 1994	130510	7				95,96,97	

Submitted by:

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Virgil K. Moore, Chief  
Bureau of Fisheries

  
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